

# **ARCTIC GRAYLING RECOVERY PROJECT**

## **2004 WORK PLAN**

### **I. Primary objectives:**

**A.** Monitor the grayling populations in the Big Hole River through spawning, summer, and fall population surveys.

**B.** Monitor Axolotl and Green Hollow II Lake's brood reserve populations and collect gametes in Axolotl Lakes and Green Hollow II Reservoir as needed for reintroduction efforts and remote site incubators (RSI). Collect fish for disease testing as needed. Coordinate gamete collection, brood management, health and genetic concerns with USFWS, MFWP and UM personnel.

**C.** Assess survival, maturity, distribution, and habitat use of grayling reintroduced into the Upper Ruby River, the North and South Forks of the Sun River, Beaverhead, and Missouri River Headwaters.

**D.** Monitor water temperatures and flows in Big Hole, Ruby, North and South Forks of the Sun, Beaverhead, and Missouri River Headwaters.

**E.** Habitat - Continue Flow Enhancement Project on the Big Hole River. Identify additional projects to maintain minimum in-stream flows and promote working relationships with local water users. Continue investigation of tributaries for potential water conservation. Continue to assess and identify riparian enhancement, fish passage and irrigation efficiency projects.

**F.** Work as a technical advisor to the Big Hole Watershed Committee (BHWC) and water users. Refine Drought Management Plan and conservation strategies to ensure the perpetuation of fluvial Arctic grayling in the Big Hole River.

### **II. Monitoring and Research**

**A. Spawning Surveys:** We will electrofish the McDowell, Wisdom, North Fork, and Pintlar-Squaw sections of the Big Hole River, and additional tributaries as time permits to monitor the spawning grayling population and assess recruitment. Electrofishing will be discontinued when ripe females are encountered to protect spawners and larvae.

**B. Axolotl Lakes Brood:** We will conduct a mark-recapture survey to assess the population demographics, and collect gametes for future reintroductions or RSIs. Disease sampling protocol will be followed during gamete collections. An additional plant from the Bozeman Technology Center may be made if necessary.

**C. Green Hollow II Brood:** We will conduct a mark-recapture survey to assess population demographics, and collect gametes for future reintroductions. Disease sampling protocol will be followed during gamete collections. A trap will be maintained at the inlet to capture trout moving downstream from Green Hollow Creek to decrease potential competition and reduce disease concerns. A barrier will be maintained to prevent grayling attempting to move upstream. An additional year class may be planted from the brood at the USFWS Fish Technology Center.

**D. Population Monitoring:** Big Hole River: In the upper river we will conduct fall electrofishing mark-recapture surveys to assess population demographics and derive estimates. If flows are sufficient, in 2004 we will survey the Wisdom, 40 Bar, McDowell, tributaries may include but are not limited to Deep Creek, Steel Creek, Swamp Creek, Fishtrap Creek and LaMarche Creek and the “pools” to monitor the grayling population and collect information on sympatric sportfish and native species. We will continue to expand our survey efforts to additional tributaries, side channels and mainstem reaches to better assess population demographics.

**E) Distributional and Movement investigations:** To identify additional flow and temperature refugia for Arctic grayling during low flow and high temperature regimes we will continue to conduct surveys in tributaries, side channel, and ditches between Jackson and Wise River. Abundance will be assessed through visual observation, snorkeling, electrofishing, and fish traps at various times through summer and fall. Habitat assessment evaluating connectivity, flows, temperatures and riparian health will be completed for each reach.

**F) Wise River:** We will continue to work with BDNF to assess grayling use and origin in Wise River and tributaries. Electrofishing and snorkeling surveys will be completed at various times throughout the summer and fall. Fin clips will be taken for genetic analysis. Tags will be deployed to identify individual fish and track movement, growth etc.

### **III. Habitat**

**A. Temperature Monitoring:** We will continue to expand temperature monitoring from mainstem Big Hole to tributaries to assess thermal refugia. Hobo temperature loggers will also be deployed in the Ruby, Sun, and Beaverhead Rivers.

**B. In-stream Flow Protection and Discharge Monitoring:** We will continue to monitor flows in the upper Big Hole River. We will work closely with the USGS and DNRC to more accurately update the USGS gauge during low flow regimes. We will work closely with the BHCW to review The Drought Management Plan and make changes as needed. For summer 2004, 19 stock water wells and 2 springs and 2 pipelines will be operable. We will investigate and promote additional water conservation projects.

**C. Water Budget Study:** The purpose of the study is to assess flow gains and losses in the upper Big Hole River. The project will assist in identifying areas to apply water conservation efforts. In 2004, we will continue work initiated in 2002-2003 and will repeat the assessment between Peterson's Bridge and Steel Creek. We will also continue to expand the study upstream into the North Fork and possibly additional tributaries. This is a cooperative study with DNRC/ MFWP, and PFWP.

**D) Wetted Perimeter:** We have recommended to the BHCW an adaptation to the Drought Management Plan by adding a minimum spring flow equal to the upper wetted perimeter flow (160 cfs) during grayling emergence in the upper Big Hole spawning reaches. Spring flows in the upper Big Hole River have fallen below this critical level in previous years and may partially explain the current poor level of grayling recruitment.

**E) Fish Passage :** We will investigate headgates or diversions that may inhibit fish passage. We will propose alternatives to landowners to enhance fish passage as needed.

**F) Riparian Enhancement:** We have constructed a GIS database based on the habitat inventory from the upper Big Hole in 1994. The database will assist in prioritizing riparian enhancement projects. We are currently working with landowners complete projects initiated in 2003 and to assess potential projects for 2004 and beyond.

#### **IV. Reintroductions**

##### **A. Plant Numbers for 2004:**

- Bluewater State Fish Hatchery: 70,000, Origin Axolotl Lakes, Average length 8.7" June 1.
- Bozeman Fish Technology Center: Age 2: 1,500, Completed Brood, Average length 9.5"

##### **B. Plant Locations:**

- Ruby River: We will recommend yearling stocking rates depending on overwinter survival of 2003 plants. Surveys to assess survival will be completed in April 2004. Ruby will receive 1,500 age 2 grayling from BFTC and 225,000 eyed eggs for RSI.
- North Fork Sun River: Collect Temperature Data/RSIs?
- South Forks Sun River: No Fish
- Lower Beaverhead River: No Fish
- Missouri River Headwaters: Back up for Ruby Fish

##### **C. Planting Schedule:**

Yearlings; May 3 - May 24, 2004

Age 2: June 2004

RSIs: May 20-June 15, 2004.

**A. Ruby River:** We will continue to monitor survival of grayling planted into the upper Ruby River. We will conduct spring surveys to assess survival, movement, distribution, and spawning potential. We will continue fall electrofishing surveys in the Vigilante, Section One, and others as needed to monitor grayling plants and rainbow, cutthroat, and brown trout populations. Dick Oswald will continue surveys on the Three Forks and Greenhorn sections and gill netting in Ruby Reservoir. We will continue to use the voluntary creel to assess capture rates, species composition, distribution etc. We will continue to use RSIs and assess success at different locations and with eyed eggs. We will monitor RSI success through out summer and fall. We will continue to track whirling disease and assist Dick Vincent as needed.

**B. Sun River:** Objectives for 2004 are to 1) Determine if any grayling are remaining in the two forks 2) Determine if any natural reproduction has occurred, 3) Investigate life history patterns of grayling in Gibson Reservoir and tributaries, 4) Determine if grayling have moved downstream into Diversion Reservoir and 5) Continue temperature assessment in the North and South Forks and tributaries and/or or use RSIs.

To assess survival, distribution, growth, condition factor, of 1999-2001 plants, we will assist Region 4 personnel with spring surveys in Gibson Reservoir, Diversion Dam and electrofishing surveys at the mouths of the North and South Forks. We may snorkel reaches from Ray Creek to the Wilderness Boundary on the North Fork. We will further investigate Gibson tributaries as potential spawning and rearing habitats. Volunteer angler surveys will be continued. Thermographs will be deployed in mainstem and tributaries.

**C. Beaverhead River:** Planted grayling from 1999-2002 will be monitored by electrofishing three traditional sections in both spring and possibly fall if instream flows and temperature regimes are appropriate. The Grayling crew will assist Dick Oswald as needed for surveys. Hobo temperature loggers will be distributed to assess temperature regimes. Flows will be monitored at the USGS Twin Bridges station.

**D. Missouri River Headwaters:** We will monitor the previous plants with electrofishing surveys coordinated with Spoon and Bozeman Area Management Biologist as time and workload permits. Temperature and flow regimes will continued to be monitored at USGS sites. Any grayling not planted in the Ruby River will be planted in the Missouri River Headwaters Restoration Reach.